

REMARKS

This amendment is presented in the revised format permitted in the notice entitled "Amendment in a Revised Format Now Permitted," which was published on the USPTO's website on January 31, 2003.

Claims 11-30 remain in the application. It is noted that claims 1-10 were rejected in the Office action mailed January 24, 2003. However, claims 1-10 were canceled by the preliminary amendment filed on January 25, 2002.

Reconsideration of the rejection of claims 11-30 under 35 USC 112, second paragraph, as indefinite, is respectfully requested. It is the examiner's opinion that the term "network or fabric-like" in claims 11 and 24-28 renders the claims indefinite. What is meant by the term "network or fabric-like" is clearly illustrated in applicants' drawings at Figs. 8 and 9, which show a netlike, netted or meshed material. Further, conductors of the type described in applicants' specification are well known in the art. For example, US Patent 6,411,018, which was cited of interest by the examiner, describes "net-like or woven cloth-like" electrodes 6 and 7. While applicants believe that the term "network or fabric-like" is definite, applicants have amended claims 11 and 24-28 by substituting the term "netting of electrically conductive wires" for the language "network or fabric-like." The word "netting" is defined as "a netted or meshed material" (The World Book Dictionary, 1987, Vol. 2, p. 1396). Accordingly, claims 11-30 fully comply with the requirements of 35 USC 112, second paragraph.

Reconsideration of the rejection of claims 11, 12, 17, 20, 21, 24, 27, 29 and 30 under 35 U.S.C. 102 as anticipated by Binding (US 6,208,026) or Yasuda (US 4,845,399) is also respectfully requested. In Fig. 4, Binding teaches a monolithic multilayer actuator having an outer electrode 6 made of "knitted wire" 10. Yasuda teaches a laminated piezoelectric transducer having flat side leads 34 (Fig. 10). Alternatively,

Yasuda teaches that the side leads 34 may be in the form of a zigzag (Fig. 13A) or a spiral (Fig. 13B) (col. 7, ll. 21-23).

As explained in applicants' specification, upon an actuation of the piezoelectric actuator, that is, when a voltage is applied between the opposed inner electrodes in the layer structure, different mechanical forces occur in the region of the inner electrodes and in the region of the contacts on the outer electrodes, and these can cause mechanical stresses and hence cracks in the outer electrodes. The outer electrodes must then in turn be provided with connection electrodes, which as a rule must also withstand mechanical stresses. Typically, external terminal wires are directly soldered to the outer electrode near the foot of the piezoelectric actuator in the active or inactive region. This conventional arrangement is shown, for example, in Fig. 10 of Yasuda et al, which shows external electrodes 36, 37 soldered to side electrodes 34. It should be noted that the side electrodes 34 in Yasuda do not extend beyond the ends of the stack.

In applicants' invention, the side electrodes are lengthened beyond the piezoelectric actuator foot, which allows a sturdier connection between the side electrodes and the external electrodes. In addition, because the outer or side electrodes are lengthened beyond the piezoelectric actuator foot, they can be contacted in a noncritical region. This makes economical production possible and reduces the risk of failure at that point. Another advantage is that an additional inactive region that may otherwise be necessary on the multilayer structure for contacting purposes can be dispensed with, which makes a shorter structural length possible and makes further cost savings possible.

Independent claim 11 calls for, inter alia, "the netting of electrically conductive wires forming outer electrodes (4, 5) being lengthened beyond the multilayer structure of piezoelectric layers in such a way that the delivery of the electrical voltage is effected

at the extensions (8, 9)." This structure is clearly illustrated, for example, in applicants' Figs. 1 and 2, which show the outer electrodes 4 and 5 having extensions 8 and 9, on each of whose lower end a respective electrical terminal for a voltage supply can be mounted.

To support a rejection of a claim under 35 U.S.C. § 102(b), it must be shown that each element of the claim is found, either expressly described or under principles of inherency, in a single prior art reference. See Kalman v. Kimberly-Clark Corp., 713 F.2d 760, 772, 218 USPQ 781, 789 (Fed. Cir. 1983), cert. denied, 465 U.S. 1026 (1984).

Neither Binding nor Yasuda shows a netting of electrically conductive wires forming outer electrodes lengthened beyond the multilayer structure of piezoelectric layers in such a way that the delivery of the electrical voltage is effected at the extensions. Accordingly, claim 11 and dependent claims 12-30 are not anticipated by either Binding or Yasuda.

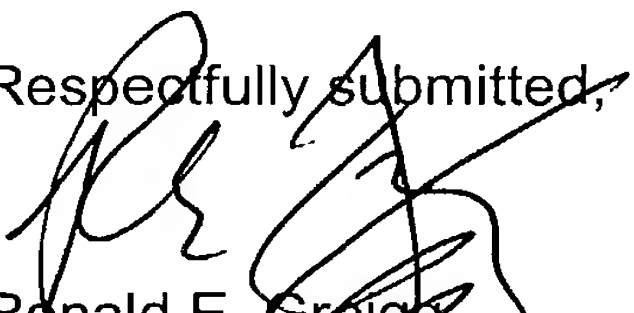
In accordance with the foregoing, applicants respectfully request that the examiner reconsider and withdraw the outstanding rejections. If, however, the examiner feels that any further issues remain or require clarification, the examiner is cordially invited to contact the undersigned in order that any such issues may be promptly resolved.

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